

DOE
Software Engineering Methodology
(SEM)

Project Plan Example

Revised: August, 2001

U. S. DEPARTMENT OF ENERGY

Office of the Chief Information Officer

Change Control Page

The following information is being used to control and track modifications made to this document.

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Note: Please read this page in its entirety

The attached document contains a project plan that is intended to be used as an example in developing project plans for DOE software development and maintenance efforts. It is not a plan from a real project; the Example Branch of the U.S. Department of Energy (EXBR) is not a real organization. References to organizations in the document are used solely for the purpose of illustrating the example.

The project plan example is in line with the DOE Software Engineering Methodology (SEM) and its software lifecycle processes, and conforms with Software Engineering Institute (SEI) and Institute of Electrical and Electronics Engineers (IEEE) project plan standards. The plan that you develop for your project may contain more or fewer pages, depending on the size of your project, but should include all of the topics addressed in the example.

The example contains references to a work breakdown structure (WBS). A WBS is a listing of all the activities that need to be performed to complete a project. It is not included as part of this example as there are a number of tools that can be used to produce a project's WBS and timeline, such as Microsoft Project, or Primavera. A WBS should be developed before the estimating and staffing sections of a project plan are completed.

The following two pages provide guidance to help you define the size and development model for your particular project.

Appendix A, Planning Questionnaire Example, uses the initial information known when the project plan was developed to fill in the Planning Questionnaire.

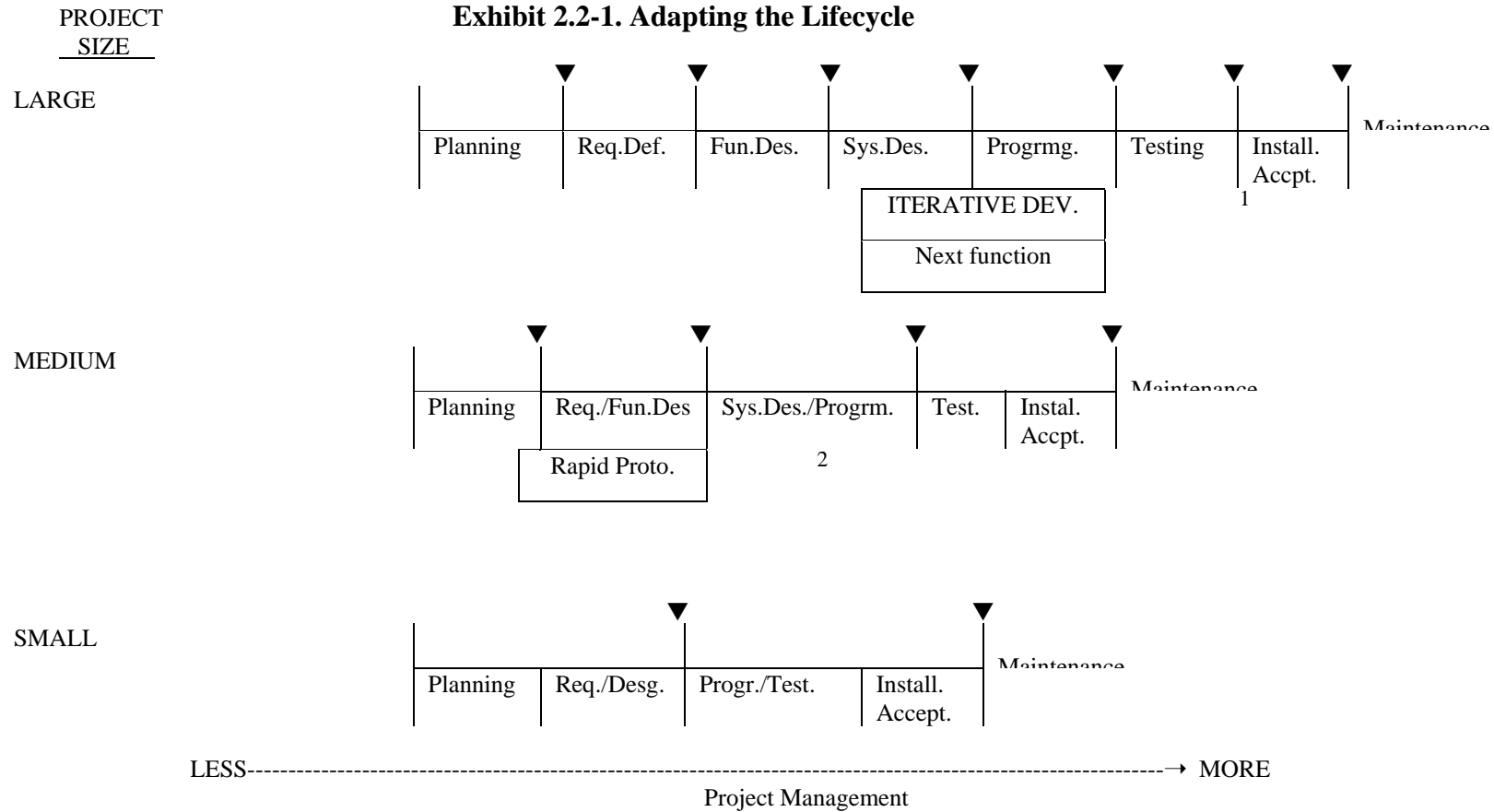
This document is available from the Software Quality and Systems Engineering (SQ&SE) web site at: <http://cio.doe.gov/sqse>. It may be used as a template by overwriting the various sections with your project plan specific information. Questions and comments should be addressed to the DOE SQ&SE program manager.

Defining Project Size

COMPLEXITY: Key attributes	EFFORT REQUIRED (IN PERSON MONTHS)		
	1 - 8	9 - 24	25 - X
LOW: - Existing or known technology - Simple interfaces - Requirements well known - Skilled project team	SMALL	SMALL	MEDIUM
MEDIUM: - Some new technology - Multiple interfaces - Requirements not well known - Skills not readily available	SMALL	MEDIUM	LARGE
HIGH: - New technology - Numerous complex interfaces - Numerous resources required - Skills must be acquired	MEDIUM	LARGE	LARGE

Effort required represents all project activities, including those of functional areas.

In addition to those listed above, there may be other factors unique to a particular project or situation that will influence project size.

Exhibit 2.2-1. Adapting the Lifecycle

Note: Iterative development and rapid prototyping are optional techniques that can be used on any size project.

▼ = Stage exit occurs at this point.

¹ Each iteration produces working function(s) from integrated program modules.

² May produce any or all of requirements, system architecture, system design.

U.S. Department of Energy Example Branch

Human Resources Information System (HRIS)

Project Plan

August 29, 2001

U. S. DEPARTMENT OF ENERGY

Office of the Chief Information Officer

Document Name: Human Resources Information System (HRIS)

Publication Date: August 2001

Contract Number: XX-XXXX-XXXXXXXXXX

Project Number: Task: XXXXXXXXXXXXXXXX

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U.S. DEPARTMENT OF ENERGY

Office of the Chief Information Officer

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Document Version Control: It is the reader's responsibility to ensure they have the latest version of this document. Questions should be directed to the owner of this document, or the project manager.

This plan was generated by the Human Resources Information System (HRIS) project team. HRIS will be developed for the Example Branch (EXBR) of the U.S. Department of Energy.

This plan (dated July August 28, 2001) does not include changes that may be required because of the June 2000 Human Resources and Financial division organizational changes. Said changes are currently being assessed, and will be reflected in the next revision of this plan, as required.

Development Stage: HRIS is in the *Planning* stage of development.

Approval: A completed stage exit will constitute approval of this plan.

Document Owner: The primary contact for questions regarding this document is:

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Privacy Information

This document may contain information of a sensitive nature. This information should not be given to persons other than those who are involved in the HRIS project or who will become involved during the lifecycle.

This document contains information about each component of the project plan for Version 1, Release 1, of EXBR's new Human Resources Information System. It covers all system development activity through May 2002.

Foreword

The intent of this document is to provide information about the Human Resources Information System (HRIS) project including deliverables, schedules, risks, dependencies, assumptions, estimates, project team, and change management. This plan will:

- Provide a general product description.
- Identify schedules and activities to be performed.
- Identify required resources.
- Establish a common information source.
- Establish schedule baselines.
- Provide a basis for management tracking and control.

This plan may be revised at the end of each of the following stages of development (see the milestones section for current milestone dates):

- Requirements Definition
- Design (Preliminary and System Design will be combined)
- Programming
- System and Acceptance Testing
- Installation

All changes will be recorded in the Preface section of this document.

Background

The Example Branch of the U.S. Department of Energy, hereafter referred to as "EXBR", has undergone considerable growth since its inception in 1994. What started out as 10 employees has now grown to over 2,000, with a projected yearly growth rate of 20 percent. As decisions are made to increase staffing levels, new people need to be hired and trained in the shortest amount of time possible. Applications in support of EXBR's Human Resources Organization must be responsive to this need.

1.1 Current Environment

Currently, reliable and up-to-date personnel information is not available on a timely basis to the Human Services staff. Transactions detailing staffing changes are recorded in the EXBR Personnel Action Tracking System (EXPATS). Hard copies of this information are given to Human Resources for entry into the Payroll/Personnel System (PERSONA).

must log on to the EXBR Manpower Information System (EXMIS). In order to produce reports, a System 2000 (S2K) query must be written, with the output directed to a local printer. Sometimes an existing query can be used; other times a new query must be written to satisfy the user's request. In order to do any kind of data manipulation, an extract from EXMIS is first obtained, then the data is downloaded to an individual's workstation, with sorts/subtotals using WordPerfect macros.

Normally, several authorized individuals perform these tasks both for themselves and for other Human Resources employees. This effort takes a considerable amount of time. For this reason an automated means of downloading, storing, and distributing data is necessary for the EXBR Human Resources staff to be responsive in supporting all employees who depend on them.

1.2 Previous Activities

Previous activities that influenced the decision to develop a new application to support the EXBR personnel data needs are recorded in the following documents:

- *EXBR: An organization and its future, June, 1998*
- *The role of Human Resources in the organization, May, 1997*
- *Human Resources Capability Analysis, April 1999*

1.3 Project Objectives

The EXBR Human Resources organization needs a reliable means of tracking information about all of the personnel for whom it is responsible. This will be accomplished with the development of a new automated administrative information application called the Human Resources Information System (HRIS). The high-level objectives of the HRIS project are to develop an application that will:

- Provide a central repository accessible via local area network (LAN) for personnel data.
- Ensure accuracy and timeliness of all personnel data.
- Enable access to the data by the EXBR Human Resources staff as well as Training, Salary Administration, and other organizations as required.
- Generate a series of basic reports.

1.4 User Groups

HRIS will be developed for the benefit of the users of EXBR's personnel data. Following is a list of currently identified HRIS user groups.

New Hires Department	Training
Salary Administration	High Potential Management
Security	Equal Opportunity Compliance
EX-40 Human Resources	EX-50 Human Resources
EX-60 Human Resources	

1.5 HRIS Product Overview

HRIS will provide accurate EXBR personnel data on a timely basis for use by the EXBR administrative staff. Since the sanctioned repository of this type of information is the mainframe, several steps will be completed to make this information available to LAN users. Selection criteria will be identified to allow for extraction of all appropriate records. Mainframe extract and download programs will be designed. Extracted data will be downloaded from the mainframe and loaded to a relational data base suitable for a LAN environment.

Data fields will be normalized into a relational data base that will serve as the core of the Human Resources information architecture. An entity relationship diagram will be developed depicting the entities in HRIS and the proposed interface to other human resources applications; e.g. EXPATS and EXPHONE.

Since the EX-60 Human Resources office has a need to produce reports using both current and historical data, the HRIS data base will contain both types. The data will be updated via biweekly downloads and updates of EXBR personnel information from EXMIS on the mainframe to HRIS on the LAN. There will be different levels of data access capability that will be assigned to the users by the system administrator. For instance, the Salary Administration office of EX-60 may want to know how many secretaries were Pay Level 20 in 1990. HRIS will be able to produce a report of those people.

After the logical and physical HRIS data base has been designed, an application will be developed to retrieve data from the HRIS data base. HRIS will provide a series of generic reports that satisfy the needs of most of the administrative staff. It will also provide HRIS system administrators with the capability to produce ad hoc reports that will fulfill special reporting requirements.

1.6 Project Scope

however, is dependent on the implementation of a client server environment. This is outside the scope of the HRIS project.

It is outside the scope of HRIS to make electronic feeds to the PERSONA system. The PERSONA and EXMIS extract programs will have to be modified to extract historical information.

Once the HRIS data base is established, EXPATS will need to be redesigned to utilize the HRIS personnel data. Any redesign of EXPATS is outside the scope of the HRIS project.

Users requiring Windows installation or training will be identified, however, the actual installation and training is outside the scope of the HRIS project.

1.7 Major Milestones

Following are the major HRIS project milestones and their estimated completion dates. The activities detail is provided in the HRIS project work breakdown structure (WBS). Additional schedule and deliverables information is provided in the master schedule, section 3.7.

Milestone	Target Date
Exit the Planning Stage	08/29/01
Exit the Requirements Definition Stage	10/21/01
Exit the Design Stage	01/06/02
Exit the Programming Stage	03/10/02
Exit the Integration & Test Stage	03/31/02
Exit the Installation & Acceptance Stage	04/20/02

2.1 Development Model

Development of HRIS will follow the DOE Software Engineering Methodology (SEM). The SEM is the lifecycle methodology standard for all EXBR system development projects. Tailoring of the lifecycle for this project includes modifications to the stages, and to the number and types of documents. Listed below are the deviations from the SEM large system model that HRIS is planning to take.

Planned Deviations - Stages

The Functional Design and System Design stages will be combined into a single stage called Design. A stage exit will be conducted at the end of this stage. The Functional and System Design documents will be combined (see below). This approach will require one less stage exit and its associated activities, and does not introduce any undue risk to the project.

Planned Deviations - Deliverables

- A Feasibility Statement is not required for this project. A LAN-based approach is already being used for another application, MISview, which obtains its information from the EXBR server on a weekly basis. Since HRIS will be built on the same premise as MISview, the HRIS application is considered feasible.
- The Functional and System Design documents will be combined into a single document called the Design Specification. To reduce the risk associated with combining the two documents, mock up copies of the various screens and reports will be provided to the primary user as they are being developed to assure user satisfaction with the application's user interface.
- The Conversion and Installation Plans will be produced in the Programming stage. All necessary information to produce this deliverable will not be available earlier.
- The Configuration Management Plan will be produced in the Functional Design stage, rather than the Requirements Definition stage.
- The System Test Plan will be produced in the Programming Stage. It is felt that information will be more accurate and timely since this will be closer to the actual execution of the system tests.

The following chart defines the project team for the HRIS project. The HR Information Systems Involvement Table and its associated functional area descriptions were used to determine which functional areas should participate in the project.

Project Team		
Development Team	Service & Support	Approvers
Project Manager	Independent Tester	User Point of Contact
Senior Analyst	Documentation Specialist	Client Representative
Project Planner	Trainer	Quality Assurance
Senior Programmer 1	Security Specialist	Project Manager's Manager
Senior Programmer 2	LAN Engineer	System Owner
Programmer	Acceptance Tester	
Configuration Manager		

2.3 Roles and Responsibilities

The following chart defines the roles and responsibilities of the members of the project team and their function at stage exit.

Note: Due to staffing fluctuations, if a particular person is unable to fulfill his/her responsibilities, it will be the responsibility of the manager overseeing that area to ensure a replacement, with appropriate skills and experience, on a timely basis.

Role	Name	Org.	Project Development Responsibility	Stage Exit Function

			application purpose and design. Has overall responsibility and accountability for system and data. Helps resolve conflict.	
User Point of Contact (POC)	Dan Appleby	EX-60	In representing the HRIS user community, acts as the single point of contact for approving project deliverables and changes. Resolves conflicts.	Approve
Client Representative	Jack Buontempo	EX-431	Reviews project deliverables. Represents the field's interests and ensures that the organization's information needs are met.	Approve
Quality Assurance Contact	Ariel Masterson	Quality Assur.	Reviews and approves project deliverables from QA perspective. Reviews plans and deliverables for compliance with applicable standards. Provides guidance and assistance on process matters.	Approve
Project Manager	Wanda Shesincharge	Sys. Engrn. Svcs.	Responsible for daily planning and control of the project. Coordinates resolution of issues. Manages and coordinates technical effort. Performs adequate and timely staffing. Provides regular and timely communications.	Conduct
Project Planner	John E. Doe	Sys. Engrn. Svcs.	Prepares and administers project plans. Tracks and reports progress.	Support

Manager		Svcs.	Resolves conflict across organizations. Facilitates communications.	
Senior Analyst	Bill Queenero	Sys. Engnr. Svcs.	Reviews data model and assists in interviewing. Acts as primary author of design document.	Support
Senior Programmer 1	Philip Heartsfeld	Sys. Engnr. Svcs.	Designs user interface for the application. Writes or delegates the writing of all programs related to the application.	Support
Senior Programmer 2	To be named	Sys. Engnr. Svcs.	Designs user interface for the application. Acts as primary author of Design document. Writes or delegates the writing of all programs related to the application.	Support
Programmer	Jim Naugahyde	Sys. Engnr. Svcs.	Assists the Designer/Programmer in writing programs.	Support
Configuration Manager	Bill Queenero	Sys. Engnr. Svcs.	Prepares the Configuration Management Plan. Handles configuration management activities.	Support
Independent Tester	Ellen Biscotto	Supt. Svcs.	Conducts testing of the application at all stages of development.	Support
Acceptance Tester	L. Browne	Supt. Svcs.	Evaluates the application for overall operability and ease of user interface at acceptance.	Support
Documentation Specialist	Michelle King	IRM Plng.	Writes the user and programmer manuals.	Support

			users.	
LAN Engineer	To be named	LAN Svcs.	Provides internal consulting, testing, and support.	Support
Security	Jill Broadhurst	Over-sight	Provides guidance in the development of the Computer Security Protection Plan.	Support

2.4 Problem Escalation

Problem situations are to be resolved in an orderly and timely manner. The severity of the problem will dictate the persons responsible for resolving and the time period allowed for resolution. If no decision is made about the conflict in the amount of time stated, the project manager will proceed forward at risk.

Project Manager Resolves conflicts within the development team that revolve around the functional aspects of the application (3 business days).

Project Manager's Manager Resolves conflicts within the team concerning new policies/procedures that must be implemented. Consults with the senior area manager to resolve difficult problems (3 business days).

User POC Resolves conflict among the development team and the primary users in determining the priority of requirements when resources are limited (7 business days).

System Owner Resolves conflict among the development team, user POC, project manager in situations where differences about project scope or schedule occur or where funding issues arise (7 days).

3.1 Management Priorities

The HRIS project will provide a critical component of the EXBR Human Resources organization's application set, allowing it to provide the highest possible level of support to all of its clients - both internal and external to the branch. The highest HRIS priority is to develop a product that meets all of the user's requirements. This is followed closely by delivery of the system on the date planned. The third priority is an application that is flexible in allowing for future expansion. The HRIS development team is committed to meeting these priorities, as well as the overall project objectives.

The sections below address the project management activities that will help meet these priorities and the project's objectives. This includes how project progress will be tracked and reported, how problems will be addressed and resolved, and certain assumptions and dependencies that are key to the project's success.

3.2 Project Tracking and Control

The project schedule will be laid out in detail in the weekly status report. This is where actual completions are tracked against what was planned. The Project Planner will put all line items (activities, tasks, and sub-tasks) of the development lifecycle stages on the weekly status report with a deliverable date for each, as the work begins for a given line item. An example of a line item in the Analysis stage would be a structured walk-through of the requirements document.

If problems are encountered in the development of the project, they will be reported in a problem/issue Log. This log will consist of a problem description, date the problem was reported, person who reported the problem, person who owns the problem, the resolution, and date the problem was resolved. This log will be maintained by the project planner and used for project status discussions.

3.2.1 Status Reporting

As required

Since the HRIS development team is located in the same office suite, they will meet informally as needed throughout the project to coordinate work assignments and plan upcoming work.

sis to provide the approvers information about recent completions, accomplishments, and effort expended. The project manager will discuss the progress of the HRIS project each week at the televideo conference meeting between the development team, the POC, the system owner, the client representative, and other involved parties. The development team will also meet weekly to discuss internal problems and issues.

In addition to these weekly means of reporting status, the project manager will be available to answer questions about the progress of the application at any point in the development cycle.

Monthly

All of the above information will be summarized in the Technical Status Report (TSR). The TSR is the official reporting mechanism for the System Development organization. It is prepared monthly, and is distributed according to the standard EXBR distribution list.

3.2.2 Stage Exits (Project Checkpoints)

Each stage of development will conclude with a formal checkpoint called a stage exit. When a stage has been successfully "exited", it indicates that all deliverables due to date have been completed, all outstanding issues have an acceptable action plan, and there is a sound plan for the remainder of the project (detailed for the next stage). The project's designated approvers (sign-off authorities) must provide a written position of concur/non-concur at stage exit. All affected functional areas involved in the project also participate in and provide input to the stage exit.

3.3 Assumptions, Constraints, and Dependencies

Assumption: System Administrator ad hoc query

It is assumed that the selected operating system software (see section 4, Technical Approach) and Microsoft Windows will be procured and installed on the microcomputer of each system administrator wishing to produce ad hoc queries, and that these users will be trained in these applications prior to their using the HRIS query function.

It is also assumed that the *Microsoft Access* distribution kit will be received within 3 months.

Dependency: ACPPM Approval

Since HRIS will contain privacy data, a Computer Security and Privacy Plan (CSPP) must be developed before implementing the system. This plan will be written by EXBR's Assistant Computer Protection Program Manger (ACPPM), Jill Mozzarella. Jill must submit this plan to the CPPM and plan annual security reviews and security refresher training. Only she can authorize the placement of privacy data on an EXBR LAN.

The development team will need Human Resources's assistance in ensuring that the proper employee records are being extracted from EXMIS. EX-60 should have paper records of those people on board during fiscal years 1993 through 1997. The team will need access to this information to determine whether all of the historical personnel records have been extracted.

Dependency: Prototype Testing

An EX-60 representative will need to be involved in the testing of early versions of panels, reports, and process flow to ensure that the layouts are consistent with the user's expectations. This prototype testing will be structured to take a minimal amount of time. This user will be asked to sign off on the preliminary screens and reports.

Dependency: Document Review

The development team is dependent on the availability of EX-60 to review the deliverable documents within ten (10) business days. These deliverables will be announced in advance.

3.4 Risk Management

Risk Category: Schedule

The HRIS team has developed a project schedule that covers the anticipated span of the project. This schedule is based on estimates for requirements identified to date. Due to the project being in the early stages, it is possible that additional requirements may be identified as the project progresses through the Requirements Definition and Design stages. This may result in additional effort required and changes to the current project schedule.

Resolution of risk: If additional requirements are identified and deemed necessary for the initial release of the application, the project manager will prepare an impact assessment and all approvers will have to sign off on the impact to schedule and budget before they will be implemented.

Risk Category: Changing Requirements

There is a possibility that requests for changes to the requirements will arise throughout the design and programming stages. Typical reasons for these change requests include providing missing functionality and improved usability.

Resolution of risk: The development team will apply rigorous software engineering principles of modularity and high level functionality. As requirements evolve over the lifecycle, the team will apply the change management procedures outlined in the Change Control Process and

3.5 Project Estimates

3.5.1 Size Estimates

Estimates for the HRIS effort were determined by analyzing the project requirements that are known to date. This includes the current project objectives and information gathered during interviews conducted with various future users of the proposed HRIS application.

For this project both the Function Point estimating methodology and the Lines of Code (LOC) estimating methodology were considered. Both are valid and accepted methods of estimating size of effort for software projects. Currently, this organization does not maintain a data base of historical Function Point information. The LOC method was identified as most appropriate for this project.

An analysis of project objectives and requirements led to the identification of several major application functions required. Each of these functions were sized independently by three (3) systems analysts, each of whom has had previous experiences analogous with this project. Each was asked to provide an estimate of the number of lines of code (LOC) required for each function. The 3 estimates were then averaged to produce the following:

Function	Language	Estimated LOC
Mainframe download	COBOL	2.3k
Extract programs	COBOL	1.7k
Relational DB convert/load	COBOL	3.9k
Retrieve & view application	MS <i>Access</i>	8.5k
Standard reports	MS <i>Access</i>	2.6k

The above estimates will be revisited in the Analysis stage, after more detailed requirements become available.

3.5.2 Time Estimates

The size estimates were used to project time required for this project, based on skill/experience levels as defined in the Staffing Plan section. They were also provided to the functional areas, along with the known requirements, to support them in estimating their activities for the project. This includes documentation, testing, and training.

application. This figure was validated using a software estimating tool, which produced a range of 6,700 to 8,100 hours. To ensure all project activities are accounted for, all estimates were mapped to the activities detail in the WBS.

The resulting resource allocation chart represents a best effort to achieve a combination of optimum resource utilization and early project delivery. At the completion of the analysis stage of the project, the estimate of total person hours will be updated and the target completion date will be validated.

3.6 Staffing Plan

A variety of resources and skills will be required to complete the HRIS project. The staff for this project will need to possess the following skill sets: project management, project planning, systems design, systems analysis, programming, testing, acceptance testing, documentation, LAN engineering, configuration management, and training. Below are descriptions of the positions that need to be filled.

3.6.1 Required Skills

The **Project Manager** must have demonstrated the ability to plan development tasks, coordinate activities among various groups, coordinate the flow of work, conduct project meetings, and ensure issue resolution. This position needs very little supervision.

The **Project Planner** must be capable of developing a project plan using a bottoms-up approach. This person must be able to coordinate the activities of several persons who will provide the WBS detail, project estimates, and dependencies. This person must be able to work closely with the project manager on resolving issues and concerns across organizations.

The **Senior Analyst** must be capable of interviewing end-users, capturing user wants and needs and translating them into system requirements. This person must also be able to perform an analysis of the requirements and develop a conceptual system architecture.

The **Designer/Programmer** must be able to produce the Design Specification document and program an application, using Microsoft *Access*, based on the Requirements Specification document and the Design document. This position needs very little supervision. The Designer/Programmer is responsible for delegating program assignments to the Programmer.

The **Programmer** must be able to program and unit test specific modules of an application using Microsoft *Access* and using the Design Specification document. This position needs to take direction from the Designer/Programmer.

The **Independent Tester** must be able to review the Requirements Specification document and the Design document to determine testability of functions described therein. The Tester must be

development team to ensure an objective review of the products as they are being delivered.

The **LAN Engineer** must be able to document requirements for the system to be installed on the EXBR LAN, install the application on the EXBR LAN libraries, and write and execute a test plan which will determine adherence to LAN response time standards for the HRIS system.

The **Documentation Specialist** must be able to write the HRIS User Manual in a Windows-based word processing package. This person must be able to execute the application in order to capture screens for placement into the manual. This person must also know how to use *Access 2.0*. The Documentation Specialist must be able to create the User Manual with little supervision from the Project Manager/Analyst.

The **Trainer** must be able, based on knowledge gained in the study of the HRIS User Manual, to prepare and execute a Training Plan for approximately twenty users of the HRIS application. The Trainer must know how to use *Access 2.0*. The Trainer will be assisted by the development team as needed.

The **Configuration Manager** must be able to write a Configuration Management Plan (CMP) which identifies the project items that will be placed under formal change management and the method by which change against these items will be managed. This person must also be able to execute the CMP, managing all changes from the Design through Installation stages.

The **Acceptance Tester** must test the application separately from the development team, as an advisor to the client. This person must utilize the HRIS User Manual to determine if *all the processes* in the application are functioning correctly according to that manual, and principles of user friendliness. This person will perform his or her duties with very little assistance from the development team in order to maintain objectivity.

The following chart shows the estimated hours required by month for each person on the project.

Resource	FY 2001		FY 2002							
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Project Manager	120	160	160	160	160	160	160	160	160	80
Senior Analyst	80	160	160	80	40					
Project Planner	80	40	20	20	20	20	20	20	10	10
Snr. Progr. 1	40	80	160	160	160	160	160	120	80	40
Snr. Progr. 2	40	80	160	160	160	160	160	120	80	40
Programmer		8	4		120	160	160	40		20
Independent Tester		24		16	120	136	56	64		
User POC	80	80	40	40	80	40	40	80	40	20
Qual. Assurance	40	32	40	32	40	32	32	40	20	
Security Specialist		20	20	10	10		6	10	10	
Document. Spec.			4			104	80		10	10
Trainer			4		56	4	4	88		
Acceptance Tester		4		4			8	40	60	10
Config. Mgr.		20	20	60	60	40	40	40	20	20
LAN Engineer		4	6	10	10		6	20	10	
Total Person Hrs	480	712	798	752	1036	1016	932	842	500	250

As the above resource loading chart shows, project resources will ramp up as the project moves forward from analysis and requirements activities (September/October), to design activities (November/December), and wind down with the transition from programming and testing to pre-acceptance and acceptance activities (March/April).

Some resource leveling was performed in order to find a balance between optimizing usage of human and material resources and the project schedule.

Following is the master schedule and deliverables planned for each stage of the HRIS project development lifecycle, and their respective planned completion dates.

Stage Of Development	Stage Completion Date	Deliverable	Deliverable Completion Date
Planning	09/05/01	Quality Assurance Plan In-Stage Assessment Project Plan Stage Exit	08/22/01 08/24/01 08/29/01 09/05/01
Requirements Definition	10/28/01	Draft Requirements Specification Capacity Planning and LAN SLA In-Stage Assessment Continuity of Operations Plan Project Test Plan Acceptance Test Plan (draft) Requirements Specification (final) Stage Exit	09/20/01 09/20/01 10/10/01 10/17/01 10/17/01 10/17/01 10/21/01 10/28/01
Design (Functional & System)	01/13/02	Design Specification (draft) Computer Security and privacy plan Integration Test Plan Draft Training Plan In-Stage Assessment Configuration Management Plan Acquisition Plan Models (logical & physical) Program Specifications Data Dictionary & Xref. Matrix Design Specification (final) Stage Exit	11/29/01 11/29/01 12/08/01 12/08/01 12/22/01 12/28/01 12/24/01 12/28/01 12/28/01 01/06/02 01/06/02 01/06/02 01/06/02 01/13/02

		In-Stage Assessment System Test Plan User's Guide Operating Documentation Stage Exit	03/04/02 03/10/02 03/10/02 03/17/02
Integration & Testing	04/07/02	Test Reports In-Stage Assessment Installation Plan (final) Acceptance Test Plan (final) Training Plan (final) Preacceptance Checklist Operating Documentation (final) Stage Exit	02/17/02 03/23/02 03/31/02 03/31/02 03/31/02 03/31/02 03/31/02 04/07/02
Installation & Acceptance	04/27/02	Maintenance Plan Operational System Acceptance Test Report Stage Exit	04/05/02 04/20/02 04/20/02 04/27/02

4. Technical Approach

4.1 Programming Languages

The proposed programming language for the development of the main HRIS application is Microsoft *Access*. It was developed as a Client Server Front End and will facilitate the move to Sybase in the future. It must be used for HRIS system development because it is the only software that provides built-in security that is necessary for privacy data.

Access is a Windows product and will require the acquisition of the Windows software for all HRIS users. The HRIS System Administrators will require training in the use of *Access* to produce ad hoc queries.

Programs for supporting functions to extract, download, and convert data to a relational data base will be written in the COBOL language.

To eliminate the need for procurement and installation of Microsoft *Access* for all HRIS users, a Microsoft *Access* Distribution kit will have to be procured. This should take approximately 3 months. The development team will acquire this kit under current procurement regulations.

4.2 Security

Social Security Number, salary, performance information. Several measures will be implemented to protect the data.

Use of DTISView as a security model.

- Establish a LAN Group
- Create a User Access Table

Take advantage of *Access*' built in security.

- Relational data base format
- "Views"
- Data base password protection

4.3 Hardware/Software Requirements

HRIS users will require at a minimum a 486, 33 MHz machine with at least 6M of RAM and Windows installed. It is preferable to have a 486, 33 MHz machine with 8 M of RAM and Windows installed.

HRIS will require the acquisition of a Microsoft *Access* distribution kit to allow an executable version of the application to be created. The same kit described previously will also be used for this purpose.

The development team will require four (4) micro computers with the following configuration:

- 486, 33mhz processor
- 10m RAM
- 210m hard disk
- MS Windows 3.1
- DOS 6.2
- Mouse

4.4 Configuration Management

Configuration Management (CM) activities will begin in the Analysis stage and continue through system maintenance. CM activities will commence with the approval of the Final Requirements Specification document. A Configuration Management Plan (CMP), in line with the Software Configuration Management Guide (SCMG), will be developed and delivered concurrently with the Final Requirements Specifications by September 21, 1901.

The CMP will address the following CM elements/activities:

- Control (change control of the software configuration items; see following section for details of the HRIS change control process)
- Auditing (functional and physical reviews of the system)
- Status Accounting (detail and summary reports of the status of software configuration items)

4.5 Change Control Process

The requirements will be baselined when the Requirements Definition stage is completed. Any requirements added after that time will require mutual agreement on the part of all Approvers and modifications to the remaining scheduled deliverable dates, if appropriate.

Change initiation, logging, evaluation, and approval procedures will be detailed in the CMP, and will reflect current EXBR procedures found in the EXBR Development Team Procedures Handbook, dated February, 1901. The following identifies those persons that will be involved in managing changes on the HRIS project, and their respective roles.

Joan Aarions POC	The person authorized to request modifications/additions to the HRIS baselined requirements.
Wanda Shesincharge Project Manager	Receives modification requests and coordinates a project-wide impact assessment, to include scope of effort and time required to implement.
Dan Appleby System Owner	Authorized to review modification requests, their impact assessment, and approve or disapprove of their implementation.

If there are disagreements about the necessity or cost of the requested modifications, the PMO, Jack Buontempo, will review, assess, and facilitate a resolution.

All approved changes and their impact on the project schedule and budget (if any) will be reviewed at each Stage Exit. This will give all of the approvers and functional area representatives an opportunity to assess and plan for impact on their respective organization's schedules and budgets.

4.6 Testing Strategy

Development team
Integration testing - Development team
System testing - Independent tester
Acceptance testing - Acceptance tester

A detailed Integration Test plan will be produced in the Design stage and is targeted for delivery by December 28, 1901. The System Test plan and the Acceptance Test plan will be produced in the Programming stage and are targeted for delivery by March 31, 2002. Unit and integration testing will be included in the programmer's individual work plans.

System testing will include testing for completeness of functionality and operation of the system in its intended production environment. For test purposes the production environment will be simulated where required.

The person performing system testing will report organizationally to a person other than the project manager. This person will develop and execute the System Test plan, which will include the generation and execution of test cases, mapping to requirements, and tracking and reporting of defects.

Acceptance testing will include testing in terms of both high-level functionality and ease of use. Acceptance testing determines if the system is ready to be accepted by the client organization.

During system testing, the tester will receive integration tested programs (packages), at pre-determined points, in accordance with the project schedule and test plan. For acceptance testing, the tester will have the entire operational system available.

4.7 Quality Assurance

Quality Assurance for this project will include an In-Stage Assessment (ISA) conducted near the end of each stage of development. An ISA is the DOE standard to assure that the established system development and project management processes and procedures are being followed effectively, and exposures and risks to the current plan are identified and addressed.

The Quality Assurance consultant will be considered part of the project team and will provide project management, development process, and quality assurance support throughout the duration of the project, and will provide a position at stage exit based on his or her ongoing involvement in the project.

4.8 Defect Prevention

from being introduced in the first place. These steps will include:

- Document deliverables: All documents (e.g. requirements, manuals) will be subjected to peer reviews and Structured Walkthroughs to help ensure both completeness and accuracy of technical content. In addition, document drafts will be provided for review and comment as soon as practical, to allow for early feedback.
- Program code: All program modules will be subjected to Structured Walkthroughs and/or code inspections to help remove design and coding defects before test execution.
- Project plans: All project plans will undergo peer reviews and/or Structured Walkthroughs to help ensure all project activities have been accounted for, and to promote early alignment with other persons or organizations upon whom this project has a dependency.
- Test cases: All test cases will be inspected to help ensure they are measurable, complete, and appropriate for the function or system scenario to be tested.

4.9 Training

The necessary knowledge to use the basic functions of the new system will be provided to the end-user community through a combination of formal (classroom) and independent (self-study) training modules. An additional optional self-study module will be available for those users wishing to learn the more advanced features of the system.

It is anticipated that the training organization will be engaged to prepare the training modules and conduct the training sessions. This organization has a broad range of expertise in the training arena.

4.10 Documentation

The traditional system documentation as prescribed by the SEM is planned to be produced for this project. The planned documents include:

- User's Guide
- Programmer's Reference Manual
- System Administration Manual
- Data Base Administration Manual
- Operations Manual

The User's Guide is planned to be of a very visual, graphical orientation, to help the reader more quickly grasp the subject matter.

notification to the stakeholders that a new project may involve their area, and information to help plan resource estimates and identify risks

PROJECT PLANNING QUESTIONNAIRE

Project managers: Please complete and distribute this questionnaire to all project stakeholders (e.g., system owners, users, computer operations, telecommunications, LAN engineering, training, security, standards, documentation); see last page of questionnaire for additional guidance on developing a distribution list. Provide as many answers as are possible at this time; the questionnaire is not designed to capture detailed requirements. Consider using this questionnaire as a basis for a project startup meeting.

If the project is not started immediately after the questionnaire is distributed, redistribute at project startup to provide current information. All areas should be notified of the project well in advance of scheduling the first formal checkpoint, e.g., the Planning Stage Exit, as defined in the DOE Software Engineering Methodology.

Recipients of the questionnaire: Please review as soon as possible and provide feedback as appropriate to the project manager.

PROJECT PROFILE

Project Name & Acronym:

Contract No.:

Project No.:

Is there separate funding for this project? Yes: No:

DOE User Organization:

DOE Federal POC:

(e.g., Program Manager, Technical Monitor)

E-Mail address:

Phone:

Project Manager & organization:

(Federal or contractor. The person who has daily responsibility for planning, tracking, and controlling the project))

E-Mail address:

Phone:

Project Profile (continued)

A. Are measurable business objectives documented as goals for this project?

Name & Date of document:

Provide a brief description of what this project will accomplish. (i.e. the project objectives)

B. What size effort (e.g., as defined by the SEM¹) do you anticipate this project to be?

Small _____ Medium _____ Large _____

C. Where are the users located? (check all that apply and/or fill-in information)

☐ DOE HQ ☐ Operations Office ☐ Field Office
☐ Area Office ☐ Laboratory ☐ Power Administration

Name of DOE site, laboratory, university, or collaborative partnership (e.g., between a laboratory or university of the US and that of another country)

Other:

D. List any known assumptions, constraints, and dependencies associated with this project.

E. List any known risks associated with this project.

¹ Reference, DOE Software Engineering Methodology, Exhibit 2.1-1, Software Project Sizes

PROJECT INFORMATION

For each question, check all that apply, and supply specific information where requested.

1. This project involves: (check all that apply)

<input type="checkbox"/> System Development <input type="checkbox"/> Software Development <input type="checkbox"/> Commercial Off The Shelf (COTS) <input type="checkbox"/> Customization (of COTS)	<input type="checkbox"/> System Maintenance <input type="checkbox"/> Software Maintenance <input type="checkbox"/> Infrastructure Upgrade(s) <input type="checkbox"/> Major System Enhancement
--	---

Other

2. Platform - Software: (check all that apply)

☐ Client-Server ☐ Distributed ☐ Stand Alone ☐ Web Enabled

Other:

3. Platform - Hardware: (check all that apply)

☐ Mainframe ☐ Desktop Computer ☐ Dedicated Server ☐ Shared Server

Other:

4. Infrastructure; the target computing environment: (check all that apply)

<input type="checkbox"/> Backbone	<input type="checkbox"/> Organizational LAN	<input type="checkbox"/> Mainframe	<input type="checkbox"/> Organizational WAN
<input type="checkbox"/> Corporate ² WAN		<input type="checkbox"/> Other	

Name of WAN/LAN/Server (if known)

5. Network Topology.

☐ Ethernet ☐ Token Ring ☐ ATM

☐ Other

Project Information (continued)

² Reference DOE Information Architecture, Volume 4, Vision, page 3-20

6. Communications Protocol.

___ TCP/IP (Unix,NT) ___ IPX/SPX (Novell) ___ NetBios (IBM)
 ___ Vines (Banyan Vines)

Other:

7. Network environment required to support the application.

___ Peer ___ Single server ___ Multi server ___ Enterprise

Other:

8. The following are examples of current information systems technology, and not an exhaustive list. Please fill-in your particular technology if it does not appear. (check all that apply)

___ Data Mining	___ Data Warehouse	___ Workgroup Computing
___ Network Management	___ E-Mail / Voice-Mail	___ Remote Access
___ Distributed Application Architecture	___ Distributed Video Conferencing	
___ Push Desktop	___ Smart Card	
___ Wireless Communications	___ Modular Software Components	
___ 3 Tier Model Architecture	___ Internet Access and Support	

9. Infrastructure Impact Assessment - Local Backbone (fill-in requested information on the first line and check all that apply)

Hours of operation _____ Number of simultaneous users:

___ Connectivity exists to all identified users
 ___ Encryption required for all Messages/Packets/Transactions

The following are associated with Transporting Description:

___ Text only	___ Graphics only	___ Text and graphics
___ Multimedia	___ Voice	___ Video
___ Transaction oriented	___ File oriented	

Project Information (continued)**10. Infrastructure Impact Assessment - Wide-Area Backbone** (fill-in requested information on the first line and check all that apply)

Hours of operation _____ Number of simultaneous users _____

☐ Connectivity exists to all identified users☐ Encryption required for all Messages/Packets/Transactions

The following are associated with Transporting Description:

☐ Text only ☐ Graphics only ☐ Text and graphics☐ Multimedia ☐ Voice ☐ Video☐ Transaction oriented ☐ File oriented**1. 11. Operating Environment(s):** (check all that apply and fill-the version and release number)

V=Version R=Release

☐ MS Windows, V.R _____ ☐ OS/2, V.R _____ ☐ Unix/AIX, V.R _____☐ Windows N/T, V.R _____ ☐ VM, V.R _____ ☐ Macintosh, V.R _____☐ Novell, V.R _____ ☐ MVS, V.R _____ ☐ CICS, V.R _____☐ DOS, V/R _____ ☐ Sun, V.R _____☐ Web Browser (specify) _____, V.R _____

Other: _____ V.R _____

11a. The following constraints exist in the targeted operating environment(s) (check all that apply)☐ Firewalls ☐ Transmission speed ☐ Server capacity☐ Security ☐ Workstation capacity ☐ Remote access capability☐ Widely dispersed user community without appropriate inter-operability

Other:

12. Identify the programming languages you will be, or are considering using: (check all that apply and fill-in the version and release number) V=Version R=Release☐ Cobol, V.R _____ ☐ Java, V.R _____ ☐ C++, V.R _____☐ Visual Basic, V.R _____ ☐ FoxPro, V.R _____ ☐ Paradox, V.R _____☐ HTML, V.R _____ ☐ Delphi, V.R _____ ☐ Visual C++, V.R _____☐ Power Builder, V.R _____ Other _____, V.R _____

Project Information (continued)**13.** What is the sensitivity of the project's data?
☐ Classified ☐ Unclassified Sensitive ☐ Unclassified Non-Sensitive
13a. Which protective means are required³ ? (check all that apply)

<input type="checkbox"/> Firewall	<input type="checkbox"/> Encryption	<input type="checkbox"/> Token	<input type="checkbox"/> Digital Signature
<input type="checkbox"/> User controlled ID and password	<input type="checkbox"/> Removable hard drive		
<input type="checkbox"/> User ID & Password, controlled by system administrator	<input type="checkbox"/> Physical Security		
<input type="checkbox"/> Read/write access, controlled by system administrator	<input type="checkbox"/> PKI		

Other:

14. List the database management systems you will be, or are considering using.
☐ Oracle ☐ Sybase ☐ MS Access ☐ DB2

Other:

15. If this is a Corporate system, who is going to own the function for the corporate data administration?

(e.g. J. White, Controller; S. Black, Chief Financial Officer; T. Auburn, Director of HR)

Name & Function/Position:

16. Is the system or application's operation so essential that data must be immediately available at all times or recoverable within a short time frame?
☐ No ☐ Yes
If you answered yes, have you considered requirements for⁴: (check all that apply)

<input type="checkbox"/> Data recovery	<input type="checkbox"/> Backups	<input type="checkbox"/> Fault Tolerance
<input type="checkbox"/> System Performance	<input type="checkbox"/> Mirroring/Imaging	<input type="checkbox"/> Disaster Recovery
		(crisis management)

³ Reference DOE HQ Computer Protection Plan, Chapter 4, page 4-1⁴ Reference DOE Directives, 151, 200, 1360, and 471 (CIO Home Page = cio.doe.gov)

Project Information (continued)

17. List existing systems, applications, or data sources, if any, with which this system will interface (sharing data, receiving data from, or sending data to).

System/Application:

System/Data Source:

PROJECT MANAGEMENT FACTORS

Answers to the following questions will help provide a better understanding of how information systems project management practices are implemented within the Department.

18. Which lifecycle methodology will be followed on this project?

___ DOE Software Engineering Methodology (SEM)
___ Microsoft Solutions Framework

___ James Martin

Other:

19. The Software Engineering Institute's (SEI) Software Capability Maturity Model⁵ (CMM) identifies the relative maturity of software development/maintenance organizations. The CMM level for your organization is:

___ 1 ___ 2 ___ 3 ___ 4 ___ 5
___ No evaluation has been performed.

20. Which of the following software development/maintenance techniques (if any) do you plan to use? (check all that apply)

___ Rapid Application Development (RAD)
___ Joint Application Development (JAD)
___ Segmented Development
___ Spiral

___ Rapid Prototyping
___ Iterative Development
___ Object oriented

Other:

⁵ For additional information, visit the SEI web site at <http://www.sei.cmu.edu>

Project Management Factors (continued)

21. Which individual, team, and organizational information systems development and management practices will be implemented on this project? (check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Project Planning | <input type="checkbox"/> Requirements Management |
| <input type="checkbox"/> Configuration Management | <input type="checkbox"/> Project Tracking and Oversight |
| <input type="checkbox"/> Quality Assurance | <input type="checkbox"/> Sub-Contractor Management |
| <input type="checkbox"/> Risk Assessment | <input type="checkbox"/> Peer Reviews |
| <input type="checkbox"/> Training Program | <input type="checkbox"/> Software Product Engineering |
| <input type="checkbox"/> Intergroup Coordination | <input type="checkbox"/> Integrated Software Management |
| <input type="checkbox"/> Organizational Process Definition | <input type="checkbox"/> Organizational Process Focus |
| <input type="checkbox"/> Defect Tracking | |

Other:

22. What training do you anticipate using to complete this project? (check all that apply)

- | | | | |
|-------------------------------------|------------------------------------|--|---------------------------------|
| <input type="checkbox"/> Individual | <input type="checkbox"/> Classroom | <input type="checkbox"/> Self Study | <input type="checkbox"/> CD Rom |
| <input type="checkbox"/> Video Tape | <input type="checkbox"/> I-TV | <input type="checkbox"/> Computer Based Training (CBT) | |

Other:

23. Which medium will be used for the project/system documentation? (check all that apply)

- | | | | |
|-----------------------------------|---|-----------------------------------|--------------------------------------|
| <input type="checkbox"/> Web Site | <input type="checkbox"/> Hardcopy | <input type="checkbox"/> CD Rom | <input type="checkbox"/> Online Help |
| <input type="checkbox"/> Video | <input type="checkbox"/> Quick Reference Card | <input type="checkbox"/> Diskette | |

Other:

24. What measurements will be used to track this project? (check all that apply)

- | | | | |
|----------------------------------|--|---------------------------------|------------------------------|
| <input type="checkbox"/> Cost | <input type="checkbox"/> Schedule | <input type="checkbox"/> Effort | <input type="checkbox"/> LOC |
| <input type="checkbox"/> Defects | <input type="checkbox"/> Function Points | | |

Other:

Questionnaire Completed by
Organization :

Date:

Distribution List

In general, the completed questionnaire should be sent to all immediate and extended project team members who will participate in project stage exits or major checkpoints. Please refer to the Software Engineering Methodology (SEM), Appendix E, Stage Exit Process Guide, Examples 2, 3, 4, and 5, for guidance on preparing a distribution list.

Optional

A peer review, e.g., conducted by someone who has been involved with a similar project, can provide helpful insight and help improve the quality of the questionnaire and the project. Has an independent peer review been conducted on this completed questionnaire?

___ Yes ___ No

If Yes, conducted by:

Name _____ **Date** _____

Name _____ **Date** _____